Electronic Version
Stylesheet Version v1.1.1

Description

[Streamlined Electrolyzer]

Background of Invention

[0001] Society requires fuels produced in bulk, and stored to ensure their availability. Patent number 4,255,245 details "the construction of an electrolyzer for the production of hydrogen on an industrial scale". Hydrogen is typically created at industrial sites, then is stored on location, or shipped to be stored at another location, or directly distributed. Piping, and tanking are dangerous means of product distribution due to the risk of unintended explosion.

[0002] The electrolysis of water releases constituent hydrogen and oxygen gasses; Hydrogen and oxygen is then separated from one another and then is stored on location, or shipped to be stored at another location, or directly distributed, but they are used hesitantly because of their explosive sensitivity, and the extreme cold needed for storage.

[0003] Hydrogen and oxygen production methods, uses, and

storage techniques are described in patent number 5,690,797.

Summary of Invention

[0004] The components necessary for separation of hydrogen and oxygen gasses can be eliminated from the design of an electrolyzer for certain applications. Previously unachievable scales of construction are producible with the streamlined design, which has the potential to relieve dependency on distributed combustive fuels through piping and refillable storage devices. This invention will enable the common individual to generate a substitute fuel from tap available conductive water, and electricity.

[0005] The innovation of the invention is the demand for immediate combustion of product hydrogen and oxygen gasses; the apparatus generates a combustible hydrogen and oxygen gas mixture that can be ignited to produce a flame.

[0006] The invention can be integrated into devices that currently rely on various other fuel sources: lighters, stoves, ovens, furnaces, boilers, heaters, metallurgy (Steel, and other materials that require huge temperatures), and construction (blow torch) scenarios are all potential applications. This device will give individuals an alternative fuel source

other than traditionally distributed fuels from piping, or independent storage devices.

[0007] The invention does not include separate anode and cathode elements need to separate hydrogen and oxygen gasses from one another; they remain in a mixture as they permeate the liquid/gas filter [4], pass through the product chamber [4], and exit the apparatus through the output valve [8]. There is no temporary storage of the hydrogen and oxygen gasses within the apparatus; they are promptly expelled from the product chamber [4] to reduce the amount of water reformation.

Brief Description of Drawings

[0008] Figure 1 contains a two dimensional illustration of the streamlined electrolyzer. The picture includes the following components: the input valve [1]; a reaction chamber [2]; a liquid/gas filter [3]; a product chamber [4]; an output valve [5]; absorbent material [6]; and a conductive element [7]. The dependency of the streamlined electrolyzer design is fulfilled if there is a sealed connection between the reaction chamber [2], the liquid/gas filter [3], and the product chamber [4].

[0009] Figure 2 contains a three dimensional illustration of the streamlined electrolyzer. The picture includes the follow-

ing components: the reaction chamber [2], the liquid/gas filter [3], the product chamber [4], and the conductive element [7]. In the forefront of the image is the reaction chamber [2]. The conductive element [7] penetrates the reaction chamber [2]. The liquid/gas filter [3] is connected to the reaction chamber [2]. The product chamber [4] is connected to the opposing side of the liquid/gas filter [3] in consideration of the connection between the reaction chamber [2] and the liquid/gas filter [3].

[0010] Figure 3 contains a three dimensional illustration of the streamlined electrolyzer. The picture includes the following components: the reaction chamber [2], the liquid/gas filter [3], the product chamber [4], and the conductive element [7]. In the forefront of the image is the product chamber [2]. The liquid/gas filter [3] is connected to the product chamber [2]. The reaction chamber [4] is connected to the opposing side of the liquid/gas filter [3] in consideration of the connection between the product chamber [2] and the liquid/gas filter [3]. The conductive element [7] penetrates the reaction chamber [2].

[0011] Figure 4 consists of a three dimensional explosion of a section of the liquid/gas filter. Within the small brackets is a small section of the entire filter. Within the big brackets

is an explosion view of the section within the small brackets. This explosion is not to scale; the diameter of the microporous tubes within the large brackets is 15 pico meters per tube.

Detailed Description

[0012] A reaction chamber [3] is formed of a non-conductive material. The shape must be congruent with the shape of the liquid/gas filter [4] to ensure a sealed connection. The size, and consequently the input rate are set by the parameters of the desired hydrogen and oxygen production rate.

[0013] A product chamber [4] is formed of a non-conductive material. The shape must be congruent with the shape of the liquid/gas filter [4] to ensure a sealed connection. The size should be minimized to force hydrogen and oxygen gasses to exit the apparatus expeditiously, which will reduce water reformation within the product chamber [4].

[0014] Water reformation in the product chamber [4] will be dealt with as follows: the product chamber contains an absorbent material [6] that will transfer recombined water to an unobtrusive location.

[0015] The input valve [1] is a one-way valve. The material of the valve can be a metal, in which case it must be fully insu-

lated on all exterior and interior surfaces to prevent the unintended transfer of electrical current.

[0016] An output valve [5] is a one-way valve. The material of the valve can be a metal, in which case it must be fully insulated on all exterior and interior surfaces to prevent the unintended transfer of electrical current.

[0017] A liquid/gas filter [3] is formed of microporous hollow tubes that have the following attributes; the diameter of the tubes must be set to a range that is between the diameter of the gaseous hydrogen and oxygen molecules, and the liquid conductive water molecules. When the diameter of microporous hollow tubes are set to 15 pico meters hydrogen and oxygen gasses are small enough to pass through the tubes, and water is large enough to be restrained. The length of the tubes does not have any conditions.

[0018] The liquid/gas filter can be substituted by ®Licquicel Membrane Contactors. Their website address is; "www.Liquicel.com". The devices sold by the company are capable of removing suspended gases from liquids. The company produces a complete device allowing liquid to enter, exit, while separating the suspended gasses.

[0019] Patent number 5,795,450 includes an electrolyzer that

contains individual anode, and cathode elements. The device contains and electrolytic reaction that produces hydrogen and oxygen gasses. Hydrogen gas collects at the anode, and oxygen gas collects at the cathode. These gasses are separated from one another in order to achieve storage conditions.

[0020] Patent numbers 5,690,797, and 5,589,052 both contain individual anodes and cathodes for the separation of hydrogen and oxygen gasses from one another. These two previous patents, and patent number 5,7795,450 include components to separate hydrogen and oxygen gasses from one another. This is a common design component; most if not all-coexisting electrolyzers have storage in mind when designing the apparatus.

[0021] Patent number 4,369,102 includes an apparatus that uses microporous membrane technology for the separation of gasses from liquids. The patent clearly states, "The apparatus also comprises separate outlets, collectors, and consumers for each gas". The device of patent number 4,369,102 separates the product hydrogen and oxygen gasses from one another with individual anode and cathode components the same way as patents 5,690,797, 5,589,052, and 5,795,450.

[0022] The streamlined electrolyzer required no fuel storage other than conductive water. Piping is safe, but there is always a chance that tragedy will occur. Independent fuel storage devices are safe, but there is always a chance that tragedy will occur.

[0023] The traditional gas stove requires fuel to be supplied via piping, which must be part of a network to supply all of society. The streamlined electrolyzer produces a flame, and requires no fuel storage. If a stove equipped with a streamlined electrolyzer is accidentally left on, the gasses that are emitted into the room will immediately reform into water, which removes the possibility of tragedy.

[0024] The hydrogen economy of the 1980"s was period of scientific debate over how to move society into a new generation of fuel dependency. Hydrogen was considered as a possible substitute fuel for petrochemicals, but there are several drawbacks including; the cold temperatures need for storage, and the high volatility of a homogenous hydrogen mass. The necessity to ensure safety has resisted the commercialization of hydrogen fueled power systems due to the latter drawbacks.

[0025] The streamlined electrolyzer produces hydrogen and oxygen gasses that are combustible. Storage of product hy-

drogen and oxygen gas mixture is not possible because water reformation is imminent. The hydrogen and oxygen gas mixture is useful if ignited otherwise it will be lost to water reformation.

[0026] The streamlined electrolyzer does not generate hydrogen and oxygen gasses intent to be stored. Storage is not necessary for certain applications. The elimination of fuel storage removes the possibility of the unintended combustion. The streamlined electrolyzer eliminates the dangers of fuel storage by eliminating the need for it entirely.

[0027] The streamlined electrolyzer does not produces hydrogen and oxygen gasses that can accumulate, water will immediately begin to reform if the gas if given minimal time to react. The hydrogen and oxygen gas mixture will not collected in a room, it will reform into water.

[0028] The streamlined electrolyzer produces hydrogen and oxygen gasses that are threatened by imminent water reformation; the only application for such a gas mixture is combustion.